



Technical Protocol for Forages establishment in smallholder farming Systems



Africa RISING- Babati, Northern Tanzania,

October 2017

Forage as an agro-ecological intervention in farming systems: Technology Protocol

Introducing forages as soil and water conservation crops thrives well within existent farming systems that are on sloping fields. Single or intercropped forage grasses such as Napier grass (elephant grass) and forage legume cover crops such as Desmodium and Lablab are introduced during land preparation on terraces or as strips across the slopes of agricultural fields. There are two threshold limits one needs to consider; the length of the slope and the steepness of the slope. The purpose of forages within the landscape is to (1) increase infiltration time and reduce run-off, (2) to break the land slope, thus reducing the velocity of the runoff water, (3) stabilize the soil, reduce the movement speed of running water, and thus reduce the surface erosion. Their use as forages is described in Chapter 5 while the role of the legumes in soil fertility improvement is described in Chapter 2. Where applicable, incorporation of forage grass and forage legume combinations into smallholder farming systems (from farm-scale to landscape level) will play a critical role towards higher crop and forage water productivity, increased soil retention and nutrient composition and improved agricultural soil moisture management.

There are numerous benefits associated with the use of forage grasses and legumes as soil and water conservation measures:

- Increased crop water uptake for dry matter production hence increased yields;
- Increased infiltration rate of the soil which allows the use of as much rainwater as possible to fill the soil reservoir;
- Reduced soil evaporation rates (however, this needs to be balanced out by forage consumptive water use)
- Soil protection from erosion through reduced runoff and reduced raindrop impact and wind erosion;
- Reduced soil compaction and crusting while preserving soil structure, increases soil moisture availability.
- Forages such as desmodium, lablab, mucuna and Cowpea could play a dual purpose role and serve as food and feed while increasing biological nitrogen fixation in the soil.

Note that the effectiveness of any Best Management Practice can vary considerably from site to site and may be contingent on: initial conditions, hydrology, soil type, crop preference, practice design and management characteristics (which can be highly variable). The procedures highlighted hereafter are meant to serve as guidance criteria rather than prescriptive.

1. Prepare land well with no weeds, ploughing done across the slope
2. Procure good seeding materials from reliable suppliers and in time in order to plant soon after the first few rain events of the rain season.
3. Plant forage grass as a cutting at a planting depth of about 10 cm with a planting hole structured as a trough to capture sufficient rainfall for good establishment;
4. Plant across the slope following a contour pattern, with a spacing of 1½ m from one Napier grass stalk to the other across the slope. Allow for at least 5 m distance from one

contour to the other but, as a rule of thumb, the steeper the slope, the closer the contours hence the forage grass plantings to ensure maximized benefits of erosion reduction

5. Plant forage legume as seeds (either lablab, desmodium or cowpea) at a planting depth of about 2-5 cm between the forage grass stalks (Napier) at the half way mark which is about 75 cm from one Napier grass stalk to the other.
6. Periodically inspect the forage grass-forage legume contour to ensure that no weeds are emerging; these can substantially reduce the success of good pasture establishment
7. After 6-7 weeks, implement partial coppicing (prune about 50%) of the leafy biomass from the Napier grass and provide it to livestock as fodder;
8. There should not be any harvesting done on the forage legumes (lablab, desmodium or cowpea) as these establish at a much slower rate than the forage grasses. Leaving these intact will help impart the much desired soil cover effect with improved soil water infiltration into the cropping root zone.